PLAYER MANUAL

A COMPUTER GAME OF AERIAL COMBAT DURING WORLD WAR I

EAGLES™

STRATEGIC SIMULATIONS INC

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EAGLES

By Robert Raymond

EAGLES™ is a game that simulates the dogfights and melees that occurred in the skies over France and Germany in the latter half of World War One. You and your friends can take to the skies in the period's finest fighters, battling with and against the computer in hopes of driving your enemy's aircraft from the skies. With a cool head and a sure aim, you may survive, and go on to become the ace of all aces!

So grab your flying gear and climb into your craft. Your mates are ready, the sun is high, the sky clear, and the foe aloft ...

In order to play *EAGLES*, you will need the following:

- An Atari 800 with 40K of memory.
- An Atari 810 Disk Drive.
- An Atari Basic Language Cartridge.

OR

- An Apple II, II+ or IIe with 48K of memory.
- A Disk Drive.
- Applesoft in ROM.

The following rules booklet is divided into two sections. The first section describes the actual game mechanics, while the second instructs the user on how to generate various game set-ups.

PART I
RULES OF PLAY

EAGLES is a simulation of World War I air combat. During play, you will face many of the situations (in game form) that the period's pilots had to face. How you decide to act on these situations can determine the fate of you, your aircraft, and perhaps the outcome of the battle.

A dogfight in *EAGLES* can involve as many as twenty planes. Each of these aircraft has an I.D. number, the numbers running from 1 to 20 (#'s 1 through 10 are always Allied aircraft; #'s 11 through 20 are Germans). If one of the forces in the game is handled by both player pilots as well as computer pilots, the players will control the lower numbered aircraft (i.e. if there are three German planes, of which two are being flown by players, then #11 and #12 will be the players, and #13, the computer).

Play proceeds in rounds from the lowest numbered aircraft to the highest. That is, plane #1 makes his move, followed by plane #2, and so on. After plane #20 completes his turn, plane #1 goes again. Play continues in this fashion until all planes have been shot down or have returned to base.

The field of play is defined in squares running north, south, east and west. Each square represents an area roughly 50 yards on a side. There is also a third dimension of squares, which is altitude. Each level of altitude is 25 feet high. Pilots can "see" targets four squares distant (assume that they do not care about aircraft beyond that distance) and can fire their weapons 1 square out.

Beneath your wings is the network of trenches in which the great armies of the day have become stalemated. The trenches parallel each other, running north to south, and each system covers an area 10 squares in width. The Germans are in the eastern trenches, the Allies are in the western. The two systems of trenches are divided by the area of desolation called "no man's land", which is 20 squares across. Immediately behind (to the east) of the German trenches is the area we fliers call "over the German lines" which is 30 squares in depth. All locations east of that are in "the German rear area". Two similar areas exist behind (to the west) of the Allied trenches. While the above geography lesson may not seem important now, you may lose an engine some day, at which time the location of the friendlies will be of paramount importance.

Weather conditions are also of importance. There is always a wind blowing to the east, which works to move the general location of the fight eastward (towards and/or into German territories). In game terms, there is a 20% chance each round that all aircraft will move one square eastward (note that players will NOT be told that they have been moved). Clouds may also be present. Clouds are assumed to exist between two altitude levels (cloud base altitude and cloud summit altitude). All squares that exist between these altitudes are considered to be in the bank of clouds, and these squares have a visibility range of zero. This serves to make clouds an excellent place to run into if you wish to escape from a pursuer.

At the beginning of a plane's move, the screen will show an overhead view of the plane's immediate (within two squares) surroundings. To the right of this display will be the number of the plane whose turn it is, along with his altitude, the altitude at which clouds are seen, and a list of all available commands. If the plane is controlled by a player, the computer will wait until the player inputs his command. If the computer pilots the plane, then it will proceed with its move. In either case, the result of the move will be shown.

An aircraft's performance is measured in many ways. The back of the rules give listings of all types included in the game (although experienced players can build their own favorite or fantasy aircraft). The maneuver % is the measure of the aircraft's overall agility. The speed % measures the aircraft's top speed and acceleration. The higher these values, the better the plane is in that aspect. Max climb is the number of 25' altitude levels that the plane can climb through during its move. Max dive shows how fast that type can drop in 25' increments.

Note that climbing or diving can, in some cases, affect the plane's maneuver and speed %'s. Generally, every 25' dive adds 5%. This is because aircraft in climbs tend to go slower, and, as they are closer to their stall speeds, turn wider. Diving has the reverse effect. Thus, one can see that having altitude on one's opponent can be an important advantage.

The maneuvers follow ...

(U) and (D) — Altitude change.

Use of these keys results in a climb or dive. You will be asked the number of increments that the change will be, with "**1**" being 25', "**2**" being 50' and so on. Dives of 250' and over will use the following keys:

	250'	275'	300'
Atari	0	<	>
Apple II+	0	:	-
Apple IIe	0	-	=

(O) — Overview.

This command gives the pilot a complete data readout on all aircraft within 4 squares. It will show the distance in squares to each plane (where 2 3 means two squares east and three south), the aircraft's heading, its difference in altitude, and its attitude (**RB** = Right banked, **LB** = Left banked, **LEV** = level, **Z** =Zoom climb [the aircraft is going into an upward half-loop], **SS** = Split S [the aircraft is going into a diving half-loop]). Note that an Overview is valuable for spotting aircraft not shown on your screen display. The Overview can be used as many times as desired.

(G) — Ground location.

This command allows the pilot to get a general idea as to where he is. Note that it does not work if the plane is above the clouds.

The following options end the plane's movement phase.

(N) — Normal.

This will move the aircraft one square forward.

(F) — Fast normal.

This option gives the aircraft a chance to move two squares forward. That chance, expressed as a percentage, is equal to that

plane's Speed %. Altitude changes modify the chances as described above. Failure to make the speed roll causes the aircraft to move only one square. There is always a chance, regardless of the circumstances, that the aircraft might fail.

(L) and (R) — Left and right turns.

The aircraft's ability to turn tightly in a fight is its most important feature. In Eagles, a turn pivots the plane 90 degrees, then moves it one square in the new direction faced. The chance to make a successful turn is equal to the maneuver %, modified by any altitude changes. A failed turn results in a bank instead (see below).

(A) and (B) — Left and right banks.

A bank is just a wider turn, which takes the plane two movement phases to complete. On the first phase, the plane moves forward one square (at this half-way point, the aircraft is listed as RB or LB on the overview). On the second phase of movement, the plane turns 90 degrees towards the direction banked, then moves one square.

(S) and (T) — Left and right slip.

In reality, a aircraft that wishes to slip banks onto one wing and slides sideways, losing altitude. To do a slip in game terms, the aircraft must not have climbed or dived this phase. An aircraft has a percentage chance (loosely based on its maneuver %) which it must make in order to slip properly. A successful slip moves the aircraft diagonally forward one square, while failure moves it only straight ahead. In either case, the plane loses 150 feet of altitude. Note that the aircraft's nose is considered level for gunnery purposes.

(I) and (V) — Climbing and diving half-loops.

Half loops are good ways to get turned about quickly. Both take the aircraft two phases to do, and the plane may not make any voluntary climbs or dives (U or D options) during these phases.

In a climbing half-loop, the aircraft spends its first phase climbing at its maximum climb rate, while moving forward one square. At this point, it is listed as Z on the overview. On its second phase, it has a percentage chance to clear the half-loop, which is based on both its maneuverability as well as its speed. If successful, the plane remains in its square while turning 180 degrees and climbing some random distance. If it fails, the aircraft stalls and performs as if it were in the maneuver option (see below).

The classic loop is performed by doing a climbing half-loop followed immediately by diving half-loop.

(M) — Maneuver.

The maneuver option is defensive in nature, and represents desperate skidding and rolling to escape a pursuer. To perform a maneuver, the plane may not have climbed or dived this phase. The option randomly assigns a new square to the plane (either its present square, the one in front of it, the one to its right, or the one to its left) as well as a new heading. The plane's altitude also changes randomly and usually downward. Due to its gyrations, the plane will not be allowed to fire its weapons this turn.

(J) — Jam clearing.

Due to an occasional deformed ammunition casing, the player may find himself with jammed guns. To try to clear them, the player may not climb or dive, and the (J) option will move the aircraft just like an (N) option does. The jam clear option will give one of three results:

- The guns may be cleared, so that the battle can be rejoined.
- The guns may be found to be inoperative, whereupon the unlucky pilot can only retire to base.
- The guns are still jammed. This result will occur the most often. Note that the pilot can continue to try to unjam his guns in this case.

(H) — Head home.

This option is used to remove a plane from the game and return him to his base. To do this, a player must be pointing towards home (east for Germans and west for Allies) and there must not be any enemy aircraft in sight.

(C) — Continue.

This option is used to instruct the computer to continue a two phase option (i.e. banks and half-loops).

SPECIAL KEY FUNCTIONS (Atari)

The START Key

To use this option, the plane must not have climbed or dived this turn. The option is used when one of the players must drop out of the game, and reverts control of the plane from the player to the computer.

The OPTION-SELECT Keys

This option is used to end the game in mid-play. This command can only be activated during mid-turn, not during the option phase. To use, simply hold down the **OPTION** and **SELECT** keys while one of the planes is making its move. The game will then end, and the current conditions of the aircraft will be displayed.

SPECIAL KEY FUNCTIONS (Apple)

At the start of a player's move, a player can give control of his plane to the computer by pressing the "**P**" key.

To end the game on the Apple, press any key while the last German or Allied plane moves.

End of Turn Altitude Loss

After the last German plane has moved, the computer will make some modifications to the aircraft's positions. Beside figuring out the effect of wind (as mentioned earlier), it will also figure out any additional altitude losses suffered by the aircraft. As the aircraft are scrambling about after each other in their presumably tightest turns with wings close to the vertical, they will continue to lose height. Hence, any aircraft that does any option besides U, D, G, O, N, F, or J will lose 25 to 75 feet of altitude. If a plane drops to an altitude less that 25 feet due to this (or due to the Maneuver option), then it has a 1% chance of hitting the ground. Otherwise, it is boosted back to 25 feet.

GUNNERY

After a plane completes its move, but before the next plane moves, the aircraft may fire its weapons. To do this, several conditions must be met. First, the plane must have its weapons operational. Second, the target must be in the horizontal arc and range of its guns. To do this, the target must be in the same square as the attacker (effective range) or be in the square that the target is facing (long range). Third, the target must be in the vertical arc and range of the guns. If the attacker is flying level (or in a slip) he may shoot at targets within 100 feet of his altitude. If climbing, he may only shoot at targets located from his height to 200 feet above. Diving attackers can shoot at targets located at their level to 200 below. Remember that a plane that uses the Maneuver option may not fire.

If a player has at least one target, the computer will list all possible targets, along with the % chance to hit. This chance is based on both the range to the target as well as the target's deflection (tail shots are best, followed by front shots, and lastly, side shots).

The player then chooses his target, types its I.D. number, and hits **RETURN** (if the player would rather hold his fire, he should only hit **RETURN**). He will then be asked what burst length he will use. The choices are **S** (Short), **M** (Medium) and **L** (Long). Simply hit the proper key, and the computer will list any results of your shots.

Players should remember that the longer the burst, the more ammo is consumed, and the higher the chance of jamming your guns. Planes have enough ammo for roughly 9 short bursts or 5 long bursts.

If you jam, you will still be able to fire your guns, but at the next lower length burst. Short bursts that jam do not get to fire at all.

If the burst hits, the computer figures out just how many of the bullets hit. It then figures out, bullet by bullet, if something vital was hit. For each hit previously made, the chance to hit something vital increases slightly. However, a strongly structured plane has a slightly higher chance of surviving a burst, while a frail aircraft has a lesser chance.

Of course, longer bursts tend to do more damage, and twin machine guns do more than the 'one gun on the deck, one on the wing' (as carried by some allied types). Single machine guns do the fewest number of hits.

While many of the hits can destroy or force down a plane, some hits only damage it. Specifically ...

- Pilot lightly wounded: Due to the effects of the wound, the aircraft's Maneuver % drops by 25%.
- Engine begins to miss: The plane's Speed % drops to 0. However, a good dive may make an F maneuver successful. Also, the plane has a new climb rate of 1, and may not do any more climbing half-loops. This hit increases the chance that the engine will stop during future hits.
- Wing struts hit: The plane's dive rate drops 4 to 6 points, and no diving half-loops allowed. If your dive rate drops to less than 1, the plane will crash.

Notes on computer pilots: The computer pilots in the game are supposed to represent the normal, run-of-the-mill pilot who should be used to round out formations and provide solitare and semi-solitare options for the players. Note that the players can gang up on a flight of computer pilots, or they can take on each other, with computer pilots as wingmates. However, the user should be aware of the following traits of computer pilots ...

- As soon as a computer pilot loses sight of all other enemy aircraft, it will cut for home. Note that computer pilots do not have to be headed homeward in order to do the H option (This is the only instance in which they play by different rules).
- Computer pilots who jam their guns or find themselves over 100 squares on the wrong side of the lines will dive full out for home.

While computer pilots can hardly be called clever, they are swift scouts armed with machine guns, and they do occasionally pull sneaky moves. Our advice is to keep an eye on them.

PART II
SET UP GUIDE

Starting the Game

A) the Atari

To begin a game of ***EAGLES***, turn on your disk drive and insert the game disk. Place the BASIC cartridge in the proper slot in your computer, and power up the computer.

You will be asked what chip type your Atari uses. Note that most Ataris manufactured after mid-1982 have the GTIA. To see if your chip type entry is correct, study the Eagles title display (shown after all set up entries have been made). There should be a blue German plane on the right side of the screen pointed down, with a blue cloud of smoke coming from his tail. If he is green, then you have the other chip. Turn off the computer and restart.

B) the Apple

To start a game of ***EAGLES***, put the game disk into the disk drive and turn on the computer. After a few seconds a menu will appear on the screen. The menu will display the changes you can make in the game. You have four items you can change: Pressing **1** changes the German plane strength; pressing **2** changes the Allied plane strength; and pressing **3** changes the game from the normal game to the demo game. Press the **SPACE BAR** to continue.

Next, you will be asked what class of set up you want. The choices are:

P : Player controlled.
R : Random set up.
C : Campaign game set up.

The set up options work in the following ways ...

(R) : RANDOM SET UP. This is the easiest of the set up modes, as the computer takes on the main chore of setting up the game. Hence, it is the one that we suggest you use for your first few games. You will be asked the following questions:

NUMBER OF ALLIED PLAYER PILOTS? This asks how many planes will be player controlled on the Allied side. Type a number from 1 to 10 ('0' is ten) for the number of player controlled planes, or 'X' if it is to be completely computer controlled.

NUMBER OF GERMAN PLAYER PILOTS? This is handled as above.

DATE OF COMBAT? This tells the computer the time period of the war that you wish to simulate. Type the corresponding number of the date desired (or '5' if you wish the computer to pick one randomly for you).

SCALE OF COMBAT? The scale refers to the number of aircraft involved per side. The number in parentheses is the number of planes there will be on each side at that scale level. We suggest that you try some Lone Wolf games (one on one) until you get the hang of it.

After answering the above questions, the computer will inform you as to the location of the battle (in reality, almost all the battles took place over German territory. Hence, most of your fights will be behind the German lines). You will also be asked if you would like to use the optional set up rules. These options will be described later in the rules.

(P) : PLAYER CONTROLLED set up. In this mode, the players dictate all aspects of the set up. In order to do this, a good knowledge of the game is needed. The questions asked by this mode are ...

FORMATION SET UP? Allied and German formations are set up by answering questions about the number of planes, which aircraft will be used, and the number of player pilots. The main difference occurs in assigning aircraft. As the British only flew in squadrons of like craft, you are only asked once for plane type. The Germans, on the other hand, tended to group different types of aircraft in their Jastas. For this reason, you will have to tell what EACH plane type will be. Players should note that from this point on, they will have to hit RETURN after each entry.

BATTLE LOCATION. This is the location of the battle's East-West coordinate. **0** is dead center in No Man's Land, while **+** and **−** 100 put the fight over that side's airfield. Values greater than this are modified to that 100.

SKY CONDITION. This is where the base and summit altitudes of the clouds are entered. If you do not wish to have clouds, enter '**0** for both numbers.

POSITION SET UP. Here you are asked for the headings and positions of the flights. E-W and N-S Differences refer to the number of squares that the Germans are offset from the Allies. East and south are positive values. For example, if there was an E-W difference of 2 and a N-S difference of −3, then the Germans would be 2 squares east and 3 squares north of the Allies. Altitudes are then entered, as is the side which is to move first. Note that you can allow one side a sneak attack (or a "Hun in the sun", as the Allied pilots called it) by placing the ambushers one square directly behind the ambushees, and giving the ambushers the first move. Finally, the computer asks if you wish to use any of the optional rules.

Below are three historic scenarios that can be constructed by use of the player controlled set up mode. The line of code behind **POS** refers to the position set up, i.e. the Allied heading, the E-W difference, the N-S

difference, the German heading, Allied altitude, German altitude, and which side moves first. Note that most books that deal on the subject of World War I air fighting usually provide great detail on the facts, and can be used to set up many interesting games.

• **Scenario #1: OVER THERE** (one or two players). This game recreates the first two victories scored by the U.S. Air Service, which occurred on April 14, 1918. The players take the roles of Alan Winslow and Douglas Campbell, who took off to engage a pair of German scouts who had been sighted over their field. Can you recreate history by downing both Germans?

Allied: 2 NIEUPORT 28's
German: 1 ALBATROS DV, 1 PHALZ DIII
Clouds: NONE
Battle Location: −95
POS.: E, 2, −1, N, 4800, 4700, A

• **Scenario #2: VOSS'S LAST FIGHT** (one player). In this game, you are Werner Voss, victor over 48 Allied craft. While flying your sky-blue Fokker Triplane, you recklessly pursue an Allied craft behind his lines. Before you can finish him off, you glance over your shoulder to see seven SE5a's (led by James McCudden, a ranking British ace) dropping onto your tail. You are outnumbered, but too slow to run away. In reality, Voss swung into the British flight and, in a ten minute battle, managed to put bullets into every British machine before being killed. Can you do better?

Allied: 7 SE5a's
Germans: 1 FOKKER DR1
Clouds: 9000–15000
Battle Location: −40
POS.: S, 1, 0, E, 4200, 4100, G

Special note: Some accounts of the action mention that an Albatros DV came in to help Voss, but was shot down in flames. You may wish to add this plane onto the German side as a second player or computer controlled. Also, if using the optional rules, make Voss and the pilot of SE5a #1 super-aces.

• **Scenario #3: RED AND BLACK** (two players). High above the old fortifications of Lille droned the red-speckled Albatri of Jasta 11. Leading the formation in a green stripped Albatros with a white cowl, spinner, and elevators was Karl Allmenroder, victor of 30 air contests. His orders: seek out and destroy the 'Black Flight', whose five Sopwith Triplanes had been so troublesome over the Ypres Salient. Karl's pilots were confident in their leader; after all, had he not shot down one of the Black Flight two days before? But, as they scanned the western skies, the remaining four aircraft of the Black Flight attacked!

The Black Fight leader, Raymond Collishaw, spotted the plane that had downed his comrade and made towards it. Allmenroder accepted combat, as the death of the flight leader would be a major blow to the Black Flight.

In minutes, Allmenroder's plane would smash into the ground. But will it this time?

Allies: 4 SOPWITH TRIPLANES
Germans: 5 ALBATROS DV's
Clouds: NONE
Battle Location: 10
POS.: S, 1, 2, W, 8100, 8000, Flip a coin for the starting side.

Special note: One player is Collishaw, the other, Allmenroder. To win, your opponent must be shot down (major victory if killed or captured, minor if he is shot down in No Man's Land or his lines but still lives). Also, make both players aces.

(C): CAMPAIGN GAME. This set-up procedure is used when players are involved in a campaign game, which is a string of games whose outcomes affect each other and whose total outcome rates the individual pilot's success. The rules for the campaign game follow ...

The campaign game is loosely based on Jack D. Hunter's book "The Blue Max". Each player is an ambitious young flier who has arrived at a combat Jasta early in 1917, with dreams of winning Germany's highest award, the Pour leMerite. Will you end the war as an ace, or just one of the many faceless aviators whom Lady Luck neglected?

The players should have a pencil and paper handy in order to keep track of their progress.

A) TIME: The Campaign game covers the last two years of the war, and is played out in eight games. Thus, the first two games are in early 1917, the next two are in late 1917, and so on. Note that the Campaign game can take several settings to complete, due to the number of games involved.

Your overall performance over each of the three month time periods in based on how you do on that mission. If you shoot down a plane, you are assumed to have brought down a few others during that period. If you don't, then it has been a slow couple of months for you.

B) RANK: This starts at 1, and can range from 1 to 5 during the campaign. It does not represent military rank as much as it represents how you rank in the eyes of your superiors. You gain one Rank for every plane that you shoot down in an *EAGLES* game. You lose one rank for every time that your aircraft is lost (You lose an aircraft if you are shot down and crash-land behind your lines. Planes that are shot down but land safely behind your lines are recoverable, so you can keep both rank and plane. A plane that comes down in your trenches or into No Man's Land is unrecoverable, regardless of condition).

Players will note that as you gain rank, you will be assigned to fly better and better aircraft (as they become available). Also, the computer automatically gives players the optional skill bonuses. At ranks 3 and 4, the player is an ace. At rank 5, the player is a super ace. In addition, the computer will sometimes add a super ace in on the Allied side. As these aces tended to personify their planes' color schemes and fly very well, the players will be told which plane is the super ace. If you shoot him down, you will be in all the papers back home and become famous overnight. This gains you an additional rank.

C) KILLS: This starts at 0, and represents the number of planes that your pilot is assumed to have brought down over each period. To determine your kills, keep track of the I.D. numbers of the planes that you down during a game. The number of kills that you get for the plane is based on where he falls ...

IF HE GOES DOWN	*THEN HE IS WORTH*
Deep behind Allied lines	2 Kills
Behind Allied lines	3 Kills
Anywhere else	4 Kills

This reflects the fact that kills had to be confirmed in order to be counted. If you bring down most of your planes behind allied lines, you will lose credit due to "lack of witnesses".

Remember that rank is based only on what you actually shoot down IN AN ACTUAL GAME. If you shoot down a plane that falls behind your lines, you advance one rank (not four).

When you have received your 20th kill, you are assumed to have been awarded the Blue Max.

D) SPECIAL NOTES ...

• Players who are killed (i.e. engine explosion, loss of wings, etc.) or captured (by landing in the Allied trenches or territories) lose all rank and kills. If the Campaign involves several players, the lost player may restart another pilot, who has 0 kills and 1 rank.

• Players may not transfer kills and rank between themselves.

• Games must be played in chronological order, with only two games per period.

• Players who are critically wounded will require leave, and will thus not be allowed to play in the following game. Light wounds are fixed in the field, so the pilot loses no flying time.

E) OPTIONAL CAMPAIGN RULES. Some players may wish to add more realism to their campaign by including the following mini-games in their campaign. Each game is set up using the Player Controlled method and optional rules. As these games represent an actual mission and not a period, the number of planes that you shoot down

during the game is the number of kills that you gain. Rank may lost in these games for being shot down, but you can never gain rank in the mini-games. You must be familiar with the optional set-up rules.

In setting up the games, remember that players who hold Rank 3 or greater are aces, and players at Rank 5 are super aces. Players flew what they flew in the last campaign mission.

MINI-GAME #1: BLOODY APRIL. This represents the period in which the German fighters faced little fighter opposition and many unescorted two-seaters. The British aircrews were mostly green, and many did not return from their first flight.

When Played: BETWEEN GAMES 2 AND 3
Allies: Using the optional rules, substitute in 3 recon two-seaters.
Germans: 5 ALBATROS DIII's
Battle Loc.: 50
POS.: W, 1, 0, W, 5000, 5300, G

MINI-GAME #2: SAUSAGE RUN. The German High Command has been pestered by the presence of an Allied Balloon that has been directing deadly artillery fire into your trenches. Your flight has been ordered to destroy it. Good luck.

When Played: BETWEEN GAMES 4 AND 5
Allies: 2 SE5a's, one balloon.
Germans: Players fly whatever they had last game. If there are less than three players, add in computer wingmates in Phalz D3's. Players may substitute Phalz D3's in place of their aircraft (Plalz's were often used for balloon missions, due to their dive rate and durability). If a player loses a Phalz, his rank stays the game, i.e. his combat fighter is still safe in its hanger.
Battle Loc.: −36
POS.: N, 1, −2, W, 1000*, 1000*, G

**Note: the computer will change these altitudes at the start of the fight.*

MINI-GAME #3: CONTACT PATROL. It is the time of Germany's last offensive, and your staffel has been assigned to support a Schlachtstaffeln (A squadron of Hannover CLIIIs trained and assigned to massed ground attacks). Twice today, your flight has provided cover for the Hannovers as they attacked enemy positions. Now, as you once more roar over the heads of your advancing troops, you spot a group of Camels moving in to intercept. Even the Hannovers swing in as the battle begins.

When Played: BETWEEN GAMES 6 AND 7
Allies: 5 SOPWITH CAMELS.
Germans: 4 single-seater fighters, 3 two-seater fighters. Players fly whatever they did in the last game; computer pilots fly ALBATROS DVs.
Clouds: 600–3000.
Battle Loc: −5
POS.: E, 4, 1, W, 500, 400, A or G (Flip a coin).

MINI-GAME #4: THE ELEVENTH HOUR. Now the tables have turned, and the Allies have air superiority as the war grinds towards its conclusion. Outnumbered, your Jasta continues to defy the Allied formations that it encounters. Now, in early November, 1918, you are entering what may be your last dogfight.

When Played: AFTER GAME 8
Allies: Pick any fighter type available at the war's end. Give the Allies 10 of them.
Germans: Players fly whatever they flew on game 8. The German formation has 5 planes, so let any computer pilots fly ALBATROS DV's.
Battle Loc.: 40
POS.: E, 2, −2, W, 1200, 1000, A or G (Flip a coin)

Special Notes:

- Players who score their 20th kill on this game do not get the Blue Max, as the German Staff has more pressing matters to attend to at this time.
- Players who ended game 8 with a Rank of 5 may wish to fly a special aircraft on this last mission. If their rank is 5, flip a coin to determine which plane it will be, and enter it with the special aircraft function in the optional rules.

HEADS : SIEMENS-SCHUCKERT D.IV	TAILS : FOKKER DVIII
GUNS : 2	GUNS : 2
MAN % : 60	MAN % : 70
SPD % : 60	SPD % : 55
CLIMB : 5	CLIMB : 4
DIVE : 11	DIVE : 10
STRUCTURE : 75	STRUCTURE : 65

OPTIONAL RULES

The optional rules allow players to modify the aircraft generated through the Player Controlled and Random set-up modes. New aircraft types can be generated, and two-seater aircraft and balloons can be included in the game.

When using the optional rules, the screen will display a two-letter code for each aircraft. The first letter denotes the type of aircraft, and translates as ...

F = Standard game fighter.
S = Special aircraft (built through the aircraft construction option).
T = Two-seater recon aircraft.
A = Two-seater fighter.
G = Gunner.

The second letter of the code informs the user as to the type of pilot ...

C = Computer controlled.
P = Player pilot.

A * indicates that that pilot is an ace, a ** is a super-ace.

In the optional rules, you will be able to make the changes as listed below. If you want to get out of one option and move on to the next, hit the RETURN key to continue.

- **FIRST OPTION, AIRCRAFT DELETE.** By entering this mode, the user can prune down one or both sides by simply typing the aircraft's I.D. number. To leave this mode, hit RETURN.
- **SECOND OPTION, SPECIAL AIRCRAFT.** This option allows players to construct almost any single-seater used in World War One, by answering 6 questions. Examples of special aircraft can be found in the mini-games found in the Campaign game. For hints as to values, compare the type that you wish to construct to the types provided as a gauge to the new values.
- **THIRD OPTION, TWO SEATER AIRCRAFT.** Aside from the standard signle-seater scout, a second major class of aircraft that appeared over the Western front were the two-seaters. Slightly larger than their single-seater counterparts, these craft carried two men. The pilot, usually armed with a single fixed machine gun, manned the front cockpit. Behind him, facing rearward, was his observer. The observer's tasks ranged from taking photos and directing artillery on enemy positions to fending off fighter attacks with his rear-mounted swivel machine gun. While generally sluggish in the air, several types possessed good maneuverability and turning speed, and were used as two-seated fighters.

Two seaters in ***EAGLES*** require the space normally used by two aircraft. The gunner occupies the first location, which is an odd numbered I.D. number. His aircraft is the following even number. This will result in the gunner firing before the plane actually moves.

Gunner's weapons can hit targets at up to 200 feet altitude difference. They can shoot at targets in the squares to the right and left of their plane, and to the square directly behind. However, in their own square, the tail of their plane blocks fire at targets that share their altitude and heading, and their fuselage blocks firing at any targets beneath them.

Gunner's weapons carry about 20% more ammo than do other weapons. If a gunner jams (computer or player) they will automatically begin working to clear the gun. While their chance is lower than pilots to unjam, their weapons are never broken. Pilots be warned: you will not be told when a gunner has fixed his jam. You will only find out when he starts to shoot at you.

Computer pilots of two seater recon craft act just like their historic counterparts; at the first sign of enemy aircraft, they will fly for home, level, at top speed. They will only maneuver when an enemy scout gets too close.

Computer pilots of two seater fighters, on the other hand, act just like other fighters.

• **FOURTH OPTION, PILOT TYPES.** If the player wishes to redefine the pilot of a certain plane, this is the time to change it. Both aircraft and gunners can be defined as controlled by the computer or a pilot, and both can be aces and super-aces. Aces (people with 5 or more kills) and super aces (20 or more kills) get both increased gunnery chances as well as extra chances to avoid damage.

Note that all newly created aircraft are manned by the computer unless changed by this option.

• **FIFTH OPTION, BALLOONS.** During the war, both sides often relied on balloons to direct artillery fire and spy out enemy movements. These gas-bags are protected by a heavy ring of anti-aircraft guns, which shoot at targets within one square of their position (they, unlike planes, can shoot diagonally). Their accuracy is at its highest when shooting at targets close to the ground.

A balloon takes up the space of five aircraft. If the side using balloons only has one balloon up, the balloon is placed in the last five array spaces, so that up to five aircraft can be used in the first five spaces. If two balloons are up, no fighters may be used.

Note that in order to save time, the computer will skip redrawing the screen if a gun does not fire. As soon as an AA gun gets a shot, the screen will be re-drawn.

Once play begins, the balloon's crew will begin to winch the balloon down as fast as they can (about 75' to 125' per turn). Once the balloon is on the ground or destroyed, both the balloon and its anti-aircraft defense are removed from play. Note that players are not allowed to attack the anti-aircraft guns, as they are too well dug in.

CREDITS

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Angels with Canvas Wings

By

Robert S. Billings

Devil-may-care grins on handsome young faces, goggles beneath the leather helmets, and always the long white scarf trailing behind in the wind — such is the romantic view the old movies give us of the airmen of World War I. Baby-faced heroes borne aloft on those awkward-looking machines held together by little more than a few strands of wire and a pot of glue, lifting off from their cow-pasture airfields to disappear in the early morning sky on dawn patrol. It's a fascinating picture, and it does have some basis in historical fact. For these doomed young men seemed to be creating a hopelessly superhuman image and at the same time trying to force themselves to live up to it.

But look closely at the old photographs and you will see staring back at you the hollow young eyes above the tense, gaunt cheeks, giving you a sense of how hard those baby-faced heroes had to work at that image to make it last, even for their very short young lives.

It had been only a very few years before the war that man had first flown in an airplane. Armies had had little time to think about what to do with these new contraptions. But the military loves technological improvement, even though it usually takes them a long time to learn how to use each new toy effectively. Most armies had ordered a few planes and were trying to find ways to justify the expense of buying them.

By 1914 it had been generally assumed that planes could be useful for reconnaissance — as cavalry with greater speed and better visibility, and there was the hope that they could be used effectively for adjusting artillery. The airplanes did not, however, carry their own armament, and there were no plans to make them a "fighting" air force.

And so in the first few weeks of combat the planes took off on their reconnaissance missions unconcerned about the airplanes of the enemy. Often airmen from opposing armies would meet on their way to their separate missions and wave to each other as they flew past.

But in a long and bitter contest between the youth of entire nations, such a situation could obviously not long endure. And it didn't. Soon pilots were taking along pistols, rifles, shotguns, anything to do a little damage to the "enemy." With such weapons not much damage was done at first. The primitive nature of the air war at this period is best illustrated by one incident in which a flyer came back with a large hole through both wings. An "enemy" pilot had taken along a brick and thrown it at him as he flew past.

Soon the airmen were experimenting by placing machine guns on the planes. This was done most easily for the two-seaters, for the observer could be given a machine gun mounted on a ring in his own seat. Then, when he saw an enemy plane, he could stand up and blaze away. The pilot in the single-seater, however, had a more difficult problem. The best direction for him to fire was the way he was looking when he flew the plane — straight ahead. But if he did so, he would shoot his own propeller off. For a time machine guns were placed above the top wing, aimed so that they would shoot over the propeller. Of course this was far from ideal, as the pilot could not aim the gun directly in his own line of vision, and the gun was so far away that it could not be serviced if (as happened often in this period) the gun should jam.

What the airmen of course needed was for someone to come up with a means of synchronizing the firing of the gun with the turning of the propeller — so the gun would fire only when the propeller was not directly in front of it. Although the Allies were first to try out a gun firing through the propeller, it was not a synchronized burst. The propeller was plated with metal so that the bullets that hit it would (it was hoped) "bounce off."

Finally, however, the Germans managed to find a way to get a truly synchronized gun on their planes. This gave them a great advantage for some time, until the Allies were able to create a similar device. Once both sides had guns firing directly in line with the pilot's view, twentieth-century air combat could begin in earnest.

Of course the guns were not the only problem. Once the airmen started shooting at each other, the capabilities of the airplanes themselves became crucial. The plane with the greater speed and maneuverability would clearly give its pilot a distinct advantage, and throughout the war there was a continuing battle between the two sides to try to devise a plane that would give its own airmen a clear superiority.

In the beginning there was little to choose between them — each side had slow, awkward planes which were easily recognizable as lineal descendents from the Wright brothers' ungainly contraption. But by the summer of 1914 Anthony Fokker, the Dutch designer and builder of airplanes, had given the Germans a clear advantage. The Fokker E 1, a graceful, one-winged, single-seater with a machine gun mounted in front of the pilot and firing through the propeller, was a perfect instrument for the state of air warfare at the time, and by the winter of 1915-16, it had given the Germans a long-term advantage over the Allied pilots. Plane for plane, there was no equal to it in any other air force.

This advantage lasted until well into 1916, when planes were beginning to be developed which could compete with the one that had caused Allied pilots to call themselves "Fokker fodder." By the summer of 1916 the British had an answer that for a while worked fairly well. It was the De Havilland DH 2, a "pusher" type plane which had its propeller mounted facing the rear to push the plane forward. The advantage was obvious — with no propeller in front the pilot could fire a machine gun forward without danger of shooting his own propeller away. Thus the Fokker E 1 lost its greatest advantage. Still, "pusher" planes were much less maneuverable than those with front-mounted engines "pulling" the plane forward. Nevertheless, considering the state of armament on the Fokker E 1 (one machine gun with an interruptor mechanism which gave a very slow rate of fire), the DH 2 had some clear advantages.

Clearly the Allied air forces needed an effectively synchronized machine gun to fire through a front-mounted propeller. It was strangely long in coming — considering that only four months after the introduction of the Fokker E 1 a German pilot had lost his way in a fog and landed his plane at a French air field. The plane and its firing mechanism had been carefully studied and photographed, and the secret was out. But the "military mind" has been often proven blind to its own needs. The French did nothing with the "secret" — even after the results were published in a magazine. Then the British Parliament became interested — but they had, if not their own blind spot, at least their own rigid standard of ethics. Informed that the device had been patented by a Dutchman and sold to the Germans, they felt it would be improper business ethics to "steal" the device.

But with the nation's young men being killed in the trenches by the thousands, such ethical scrupulosity could not last for long. By summer of 1916 the British had the Sopwith 1½ Strutter in operation. This was a two-seater which had both a rearward-firing gun for the observer and synchronized forward-firing gun for the pilot. About the same time the French began using their Nieuport 17, which had a synchronized gun firing through the propeller, as well as another gun mounted on the wing to fire above the propeller. With planes such as these, the Allies finally overcame the advantages of the Fokker E 1, and for a time the German superiority was lost.

But by 1917 the German had won back their superiority with a remarkable new plane — the Albatros D. It mounted two machine guns firing through the propeller, thus doubling the rate of fire for the pilots. When it was introduced it was clearly superior to any Allied plane, and during the spring and summer of 1917 it reigned supreme. The combat life of Allied pilots, formerly estimated to average about three weeks, at one point during "bloody April" had shrunk to just seven days. This supremacy lasted until late in the war, when improved planes finally made it possible for Allied fighter pilots to meet their enemies on even terms. These planes included the later Spads, the SE5A. And the Sopwith Camel. And it is ironic that the highly maneuverable triplane, which became identified with the "Red Baron," Manfred von Richthofen, was first produced as an Allied Sopwith during this later period of the war.

World War I airmen learned early a few elementary principles of tactics for fighting in the air. Most important was the element of surprise — and this made the sun all important. It quickly became apparent that no one could see a plane coming "out of the sun." Therefore the best way to surprise an enemy and finish him off before he could even begin to maneuver was to fly at a high altitude until spotting a distant enemy, and then to gain a position between the sun and the prospective victim. For if you could dive straight down on the enemy so that he could not see you for the sun, you were in free until you had made your pass and fired your bursts. And if they were well aimed, your opponent was on his way down before he could get in even one shot at you.

This became such an obvious ploy that tacticians began to run variations on it. One was to set up a decoy, a plane flying innocently along all by itself and waiting for someone to pounce on it from the sun. But other planes would be flying high above, waiting to spring their own trap on the unwary attacker.

European skies were rarely cloudless, and making good use of clouds was another basic tactic used by those who stayed alive long enough to learn it. The clouds could be used in a pinch to hide in, when an enemy locked on to your tail so you couldn't shake him loose. Even better, before opening an attack, you could fly on the very edge of the cloud — in it just enough so you could not be readily seen, yet close enough to the edge so that you could see out and spot your prey before he saw you.

Once the dogfight was joined, ability to maneuver quickly and correctly became all important. Moves must be made so fast that there was no time to consider — you merely had to sense the right action and, by using the stick and rudder-bar almost instinctively, to bring it off. Dogfighting seemed so much a matter of elemental, nearly automatic reactions that getting through the first battles was the most difficult part. Many a young pilot, having learned all the tricks he could be taught in flying school, went blithely into his first fight without ever having made one tactical decision under actual combat conditions. An experienced foe would jump him and, before the novice had had time to remember what the correct move in that circumstance was, had sent him down in flame. And from that flaming dive there was never any escape, for almost no pilots during the war were allowed to wear parachutes — the military authorities had ruled that doing so might weaken their determination. Those who lived beyond the first few missions soon realized that on patrol perpetual alertness was absolutely necessary. One moment of relaxation, one failure to keep an eye cocked toward the sun, one lapse into enjoying the scenery below — and it could be all over. When an enemy might be near, always the mind must be kept on the altitude, the sun, the clouds — and, most important of all, the eye must be intently searching to pick up that slight distant speck that could become an enemy plane.

Once you spotted an enemy, you must make a decision concerning his most vulnerable direction. This would vary with the type of plane you were fighting — for the vulnerabilities of a single-seater and a two-seater were quite different. Against the single-seater you wanted to be above him and "on his tail," for he could fire only toward his front, and his guns were useless if you were behind him. But a two-seater had to be fought quite differently. It usually would have an observer in the back with a machine gun mounted so it could be fired in almost any direction except down. Therefore the best spot from which to attack such a plane was from below him and only slightly to his rear. You would then be in his "blind spot" and he could not shoot at you at all until his pilot had maneuvered so you were in position where the observer could see you. Once in his blind spot you must turn every way he turned and always stay under him. If he ever got down to your altitude you would be open to the rear gunner's fire.

Most complex were the moves you had to make when a single-seater was on your tail. The usual first choice was to turn and dive. The turn was essential, for as long as you were turning, the plane following you could not line you up in his sights. But you could not afford to relax, to fly straight for a single moment — a second or two was all that was necessary for him to freeze you in his gunsights. Then one press of trigger and it would be over.

So you would dive, twisting downward — and unfortunately losing altitude. You must somehow get away before you ran out of air space. If you had the faster plane, perhaps you could draw far enough ahead to get out of effective range and then simply pull away. But often there was not that much difference in speed between the two planes — or perhaps, if you were an Allied flyer during much of the earlier part of the war, the speed advantage would be the German's.

That left you only acrobatic tricks. You might be able to take advantage of his speed by using the trick often employed by the German ace Max Immelmann, for whom it was named. In this move you suddenly climbed and at the same time rolled the plane to one side. If you executed it perfectly, your pursuer could not get a shot at you (because of the roll you made while climbing), and the climb would slow you enough so that you would be perfectly positioned on his tail as he shot past you.

There was another way to slow your plane. It was risky but sometimes worked. In this maneuver you put the plane into a momentary stall. This would make you hang almost motionless for a moment and your pursuer would overshoot you — leaving you on his tail.

The only trouble with these moves was that everyone was soon familiar with them. Thus a dogfight with an enemy ace might drag on for long minutes of maneuver and counter-maneuver — with precarious moments and flashes of opportunity alternating so rapidly that your reaction must be instantaneous, almost without plan or thought. And of course all during these maneuvers you had to be aware that you were not flying a perfect mechanism. The little canvas-winged planes of the era, held together by wire and struts, were extremely vulnerable contraptions, and too much strain at any one of many weak points might make them collapse and fall like a rock. You had to become aware of just how much you could try to make your plane climb and with what speed, how much to turn in a steep dive, and how quickly you could pull out of that dive. A slight stress too much on the flimsy parts of your soaring bird would turn it into a pile of canvas-wrapped matchsticks. it is easy to see why, after many hours of this kind of ever-tightening tension, the hollow-eyed, gaunt-faced look became the sign of an experienced "ace."

Yet a remarkable number of men became expert at flying and fighting in these canvas contraptions. To be classified as an "ace" a pilot had to have shot down five or more enemy planes, and this goal was attained by 360 Germans, 159 Frenchmen, and no fewer than 537 British pilots. And even among the Americans, most of whom came into the war quite late, there were 88 flyers who became aces.

What kind of men flew these motorized box-kites to fame and glory? They were truly a remarkable and diverse lot. They ranged from the loud and boisterous to the introverted and withdrawn, from the dedicated military martinet to the easy-going scholar. But they obviously had to have in common both great skill and rare personal courage to overcome the odds against them.

Among the British there were such strange figures as the "Mad Major" — Captain A.A.B. Thompson, a little man who while on combat duty lived by himself in a deserted house and read classical literature when he was not in the air. At dawn he would walk to the airfield,

reading a book on the way. Arriving there, he would hand the book to his mechanic, get into his plane and fly toward the front. He would fly low over no man's land, searching for enemy soldiers on the ground. Upon finding some he would swoop low over their ranks in a long strafing run. When reprimanded by his superiors for such unorthodox flying, he protested that his machine had gone out of control and wouldn't climb. On one occasion he maneuvered into position on the tail of an enemy flyer — then merely waved and flew past. When the insulted German pilot pursued him, the Mad Major maneuvered his plane above the German's and proceeded to force his enemy down by flying almost on top of him. And when the enemy pilot finally had to land and was at his unorthodox opponent's mercy, once again the Mad Major merely waved and flew off without firing.

Perhaps a character like the Mad Major could have been possible only early in the war. As skills increased and the competition among the experts became tougher, it would be the single-minded, dedicated professional who rose to the top. Max Immelmann was one of these. A small, weak-looking German soldier, he was a vegetarian who neither drank nor smoked. His passions in life were his mother, to whom he wrote letters almost everyday, and his dog Tyras. As noted previously, he invented the famous "Immelmann turn," which enabled him to dispatch a large part of his total of 15 victories. He was methodical about his fighting, carefully studying the strengths and weaknesses of his opponents' planes. It is not certain that he was ever "defeated" by an enemy, for the evidence indicates that he dove to his death only because his synchronizer malfunctioned, causing him to shoot away his own propeller.

Many experts of military aviation history consider Oswald Boelcke the finest all-round military airman of the period. Son of a professor, he early turned his interest away from the scholarly life and excelled in all kinds of sports, from gymnastics to mountain climbing. He was one of the earliest German pilots to win attention, and he had won the Iron Cross two months after the war had started. He was one of the first pilots to fly a Fokker with a synchronized machine gun, and with that advantage he began to pile up victories. He was soon tied at eight with Max Immelmann, and his views on fighting the air war were given considerable attention by superiors. In everything from engine design to leadership of tactical formations he was extremely influential. He was even allowed to travel to the Russian Front to recruit fliers of his choice for a new fighter squadron — which was to become the crack Jagdstaffel 2. Among the flyers he chose were many who later became aces, not least of whom was Baron Manfred van Richthofen.

His reign as the most well-known and admired German pilot and leader went on for a remarkably long time, considering the large number of combat flights he had made over better than two years. Late in 1916 he had run his score to 40. When he was finally killed, it was no enemy who brought him down. While with his group attacking some British fighter planes, Boelcke was flying beside one of his students when von Richthofen cut suddenly in front of them in pursuit of another plane. The young flyer beside him made a slight mistake in reacting, and his wheels cut into Boelcke's wing. The wing fell off and the master teacher, Boelcke, went down to his death. Some idea of the youth of these flyers can be seen by the age of this veteran leader at the time of his death. The "old pro" was only twenty-five.

First among the French aces (at least in terms of credit for shooting down the most enemy planes) was Rene Fonck. He was far from first, however, in the hearts of his countrymen. Fonck had 75 official victories (he claimed nearly as many more, but this was one of the reasons he never attained the popularity of Georges Guynemer, who had fewer victories — Fonck was such a braggart and self-promoter that he was heartily disliked by most of his colleagues). Yet there was no question of his ability as a flyer and a fighter. He bragged about being able to bring down five planes in one day — then went out and proved it by bagging six in one day on two separate occasions. (He modestly said it would have been eight or more, but his guns jammed.) Rene Fonck, despite his many years of combat, went on to survive the war and gain greater dislike afterward from his countrymen for the many unpopular statements he made — all of which were carefully reproduced by the press.

But it was in Georges Guynemer that the French public found their true hero. He was a frail, timid-looking youth. He had been sickly as a child, and even as the leading French air ace he seemed a wistful boy out of place among killers. His skinny, leather-booted legs seemed sticks too small to bear a man. And toward the end of his career he had that hollow-eyed, distant-staring look that so many good World War I pilots assumed after the many combat flights, the narrow escapes, and the responsibility for sending so many men down to a flaming death.

An expert flyer, Guynemer continued through the war year after year. His kills mounted to 53. He had to fly day after day, many times in vastly inferior planes while his own plane was being repaired. On one occasion he was forced to crash land three of them, one right after the other, on the same day.

Near the end of his career when Guynemer was home on furlough, his father suggested it was time for him to leave combat for a time and become an instructor. He replied he could not afford to because of what his many admirers would think of him. He returned to the front and continued flying. Again he was forced to fly inferior planes while his own machine was away being repaired. Finally his favorite Spad arrived back at the airfield — but he had already gone out on patrol. He and a fellow pilot took on a German plane — and then were jumped by a whole group of Albatros fighters. The other pilot finally made it back to the airfield, but he had lost contact with the little Frenchman during the fight. Guynemer, however, had not returned. And he never did. No trace was found of him — the frail little body seemed to have simply disappeared. France had lost its most beloved ace.

The British had more aces than any other country in the war, but among them two stand out as vivid contrasts of British "types." Edward "Mick" Mannock, child of the poverty-stricken, street-wise, and cynical lower classes, whose father simply went off and left a wife and troop of children to shift for themselves, was at one extreme. At the other was Albert Ball. Only eighteen at the start of the war, he gazes out at us from old photographs which reveal intense and sensitive features personifying all that is best in the upperclass, public-school tradition.

Among the pilots of his period, "Mick" Mannock strikes us as much older and different — he was all of twenty-seven at the start of the war. He had had a hard childhood, went quickly to work at laborious jobs, and hated the Germans and the injustices of English society apparently with equal fervor. To deal with the second hatred, as a young man he had joined the British Labor Party. To deal with the first he had to join the war. He had been working in Turkey when the war was declared. He was imprisoned, tried to escape, was treated even more brutally, became so ill that he was finally repatriated by the Turks to rid themselves of a hopeless case (he had been nearly blind in one eye before his imprisonment, and his mistreatment had pushed him to the point of death). There was little evidence here to suggest material for a future war hero. But he recovered, served in the Medical Corps and then the Engineers, and finally was admitted to the air force. He was then twenty-nine, certainly no callow youth, and full of no grand young dreams of achieving fame and glory in the skies. He left those illusions for his fellow flyers, fresh from their public schools. He started cautiously, which led some of his fellow pilots to suspect him lacking in that first virtue they all had to pretend to have — courage. He was, of course, far from a good marksman (being blind in one eye), but he was carefully learning the capabilities of his flying machine and his gun. Then he finally began to knock down German planes. He cared little, however, for "building a score." He would let younger men put the finishing touches on a vanquished enemy to give them confidence in their "record." He was never eager to claim victories for himself. Unlike Rene Fonck, the French ace who seemed anxious to claim every plane that fell anywhere near him, "Mick" Mannock was not out to gain glory but to kill Germans, to get the war over and get on with creating the socialist society.

As his string of victories grew, like so many other of the long-lasting aces he came to dread the thought of being burned alive. In order to prevent this he carried a pistol solely to use on himself when the need should arise. Meanwhile, more and more Germans went down before

the one-eyed ace's gun. He at last reached 73 officially confirmed victories — which would turn out to be only seven short of the Baron von Richthofen's record number. One cannot but wonder who actually was the "Number One Ace" of the war (since the Red Baron was so careful to get credit for every victory possible, and "Mick" cared so little for such public forms and gave away so many victories to others). But we get what we work for, and it is probably fair that the Baron's claim to supremacy is unquestioned. "Mick" would undoubtedly be less interested in his place on the list of aces than with how far society had progressed toward the socialist ideal that was his main concern.

As was the case with so many other of the great aces, Mick Mannock's final defeat was not a clear-cut victory for an enemy. Having allowed another pilot to finish off an easy kill, he had turned toward home. Then he was seen to start a fast climb to take on a suddenly-appearing two-seater. He sent it burning to the ground and circled it twice. Then, for no reason his fellow pilot could discern, fire suddenly began to shoot out of the side of Mannock's plane. He was very low at the time, and a few moments later Mannock's plane had crashed and was burning on the ground. What killed him? No one can be sure. Flying at such a low altitude after finishing off the two-seater, he could have been killed by a lucky shot from a lowly infantryman. It would have been ironic if so. Mick Mannock was one of the few pilots who admired the infantrymen as the real "workers" of the war, the members of the "exploited class." In them he saw the hope for the future of the world.

If Mick Mannock had the longest list of victories of any British pilot, there is little doubt that the one with the strongest claim to the hearts of loyal Englishmen was the youngster (even among this youngest of all professions) Albert Ball. There was a simple earnestness in his gaze that seemed so out of place in the eyes of a professional killer. Everything about him seemed out of place. He was very religious; to him God was a clear presence who obviously supported the cause of England. He had a passion for playing, of all things, the violin. Our stereotype of the World War I flyer lifting high his drink in ribald toasts the night after battle finds little support in Albert Ball. After a particularly bad day one could find him walking alone around a red flare placed in the ground, sadly playing his favorite piece, Schubert's Unfinished Symphony, on his violin. His other passions were writing to his mother and planting vegetables.

He was not an especially good pilot, but he was a good shot. he began his combat flying in January 1916, and before long was being given credit for kills. He had many close calls, often bringing home planes that seemed hanging together by a thread. But his score mounted. One day after tea he went up by himself and worked the same ruse twice — tagging on to the end of a German formation for a short while and then going after the rear man first. In each of the two times he shot down two planes. He then came back to the airfield, landed, loaded up with fresh ammunition drums, and took off again.

But the nervous pressure was building in him also. He admitted to a doctor he had the shakes, and he told others in letters he wanted to leave the "beastly killing." Yet, ever the patriotic schoolboy, he stayed on to continue what had to be done for England. He went home on leave, fell in love with a seventeen-year-old girl — but then had to go back to France. His official score reached forty-four.

It was a drizzly gray day on May 7, 1917, when he went out with his group and ran into Richthofen's flying circus. The two groups joined in battle, the fighting spreading out in all directions. The sky darkened and the fight was broken off as the planes of both sides headed for home. Ball had been seen firing at a German plane that seemed to have singled him out to pursue. The surviving English flyers reached their air base and took stock. Ball was not there. As they waited, it grew completely dark and he still did not appear. A body was later identified as his by a man who asserted he had seen him once. Yet no one had claimed his plane as a kill. Finally, official confirmation of the victory was given to Lothar von Richthofen, the Red Baron's brother. This was not the only version of Albert Ball's defeat. One story had him being downed by a soldier in a church tower. There is ample reason to challenge the official story. Records show that, on the day Albert Ball flew his last mission, Lothar von Richthofen was not at the front at all, but on sick leave in Berlin.

Although the United States entered the war late (and as an actual fighting force of any size very late), there were American aces. In fact there were American aces long before the United States was in the war. As volunteers they had joined the French air force and become the famous Lafayette Escadrille. This remarkable group of men produced no fewer than 11 aces.

But despite the nation's late entrance into the war, there were Americans flying as Americans who also made the grade as aces. Considering the foul-up of American industrial performance in the war, it seems refreshing that the country could at least produce men who could fight. The nation had boasted about building 40,000 planes in a year. They produced no plane of American design at all. They did complete a few hundred planes of British design, most of which were unserviceable. A few could be used — but only following considerable work on them after their arrival in Europe. Even then, like some of the least dependable European planes, they were soon dubbed "flying coffins" by the men who had to fly them.

It seems quite in the national character that the biggest-scoring and most famous American ace got into flying by first becoming General Pershing's chauffeur, became (with Billy Mitchell's help) a pilot, and left as one of his artifacts of the war a film of himself shooting down a whole German Jagdstaffel (all played by one captured German airplane — which incidentally came close to being really shot down by some French pilots and antiaircraft who hadn't been briefed on the performance) — the whole put on film by the man who was later to make the famous movie King Kong.

Actually Eddie Rickenbacker was a well-known race driver making 40,000 dollars a year before he ever got into the war. And while he was quite willing to play the public relations game in any way that he thought might help things along, he was a real ace with real victories. More than that, he was a highly competent leader and administrator, teaching his men the virtues of solid discipline and imbuing them with a remarkably effective esprit de corps. During the short time that he was active as a leader in the war, his group racked up 69 confirmed victories. Fully a third of them (26) had been shot down by Rickenbacker himself. He was a genuine American Air Force hero before there was an American Air Force — indeed he well represents some of the characteristics (especially the skill at public relations) which later led to the formation of that separate force after World War II.

A discussion of the aces of World War I should properly conclude with only one man — the Red Baron himself. He stands out in the public mind (whether to the World War I buff or merely to the reader of the daily comics) as the personification of an era.

Manfred von Richthofen, eldest son of an old Prussian family, was born in 1892. From the beginning he seems to have been a natural "hunter-killer." Prussian nobles were expected to love the hunt, and he always did. Whether as a child or as a famous war ace home on leave, he loved to roam the countryside in search of any game, however large or small. And he loved trophies — usually dragging home his defeated prey to be properly stuffed and mounted. This was a trait which was to extend (in somewhat modified form, of course) even to his war victories.

At first it seemed there was a conspiracy to keep him from the heat of battle that he sought. As family tradition compelled, he was initially in the cavalry. But it soon became obvious that the real action of the war would not be found in this antiquated branch of the service. He asked to be transferred to the infantry, but was sent instead to a quartermaster post. He wrote a biting letter to his commanding officer stating he had not come to war to "collect cheese and eggs" and asked to be transferred to an air unit.

He flew first as an observer and gunner. Finally getting his deepest desire, he brought down an enemy plane. Unfortunately it fell on the other side of the lines and could not be confirmed. He sensed that he would have to be certified as a pilot if he was to become the kind of champion hunter that he wanted to be. He was admitted to flight training and had his pilot's certificate before the end of 1915. But he was not yet considered a skilled flyer, and thus was not allowed at the front in a fighter plane. He was finally permitted to pilot a

two-seater, flying with an observer. Here he piloted a plane to his first real victory in the skies, dispatching it with his forward gun and following it down to be sure of the kill. Once again the plane, however, had fallen behind enemy lines, and he could receive no offical credit for it. But he knew he had destroyed it, while piloting his own plane, and this was a beginning.

He was sent to the Russian Front, still authorized to fly only a two-seater. Then he heard Oswold Boelcke was touring the front seeking recruits for a crack new fighter-pilot Jagdstaffel. He quickly went for an interview and was accepted on the spot. Now he was where he wanted to be.

He was soon writing letters back to his "Liebe Mamma" telling her of his victories in the air. His passion for trophies of the hunt surfaced again. He would make every effort to visit the site of each of the planes he had knocked out of the air, taking back some memento of it — often the number from the canvas covering, once even a machine gun. But this was too informal a procedure for him. He wrote instructions to a jeweler in Berlin to send him a silver cup inscribed with the date and type of plane for each of his kills. As the planes went down, the silver cups were ordered and forwarded from Berlin. This went on until he had reached sixty victories. Then he was informed there could be no more silver cups as trophies — the jeweler had run out of silver and no more was available.

The Red Baron (so called because later he took to painting his plane a gaudy scarlet) was truly a man who seemed to "court" death. He was cold and distant, like a true Prussian. He had little compassion, usually following his victims down as they dove earthward, pouring bullets into them even as their planes were breaking apart in the air. And he was not above shooting at pilots who scrambled out of their wrecks, still alive. This was no intense, sensitive Albert Ball or Guynemer. This was a man who lived for the hunt and the killing, relishing the pleasure of it. Some soldiers might feel they were fighting to preserve a life worth living after the war. The Red Baron seemed to live for the pleasure of the war itself. What possible hunt could there be, in a world at peace, to equal this thrilling contest of courage and skill in the skies?

Then his Jagdstaffel leader, Boelcke, was killed. Von Richthofen himself was seriously wounded but survived. He was now leader of his own Jagdstaffel. Far and wide the world knew of the great baron flying his scarlet airplane, now a triplane copied from the English Sopwith.

Victory Number 80 came in the spring of 1918. The fallen pilot walked away from the crash. This time Von Richthofen did not spray him with bullets but flew low over him and waved. Could the Baron have felt a premonition?

It was on April 21, 1918, that the end came. Once again, no one can be sure precisely who to credit with this, the greatest of all air conquests in the war. Captain Roy Brown, a Canadian, got a distant shot in at the famous red plane while he was trying to help a fresh new pilot whom Richthofen was pursuing. Brown knew he was really too far away for a good shot, but he was dropping back and it was all he could do. Yet suddenly the red plane started to dive. Eager soldiers below ran out to look at the wreck and saw the pilot sitting dead in the cockpit, one bullet having gone clean through him, piercing his heart and coming out the other side. Eagerness turned to amazement as they checked his papers and found it was the Red Baron himself.

Was it Brown who had got him? Captain Brown had had only that one distant shot and never claimed the victory. An Australian antiaircraft unit had also been firing at the red plane, and some thought the victory should have been theirs. The best judgment that could be made, based on the bullet angle in the body, was that Brown had in fact been the one to do with one lucky burst what countless other pilots (most of them very soon dead) had so often tried to do.

For a moment the air war seemed to pause. Something momentous had happened. The British gave their greatest enemy a special funeral, taking photographs which were flown over and dropped on the Baron's home airfield with a message to his fellow pilots informing them of their comrade's death and his burial with "full military honors." The war still had nearly eight months of killing left. But for the cold, skillful, most famous hunter and killer of them all, it was over.

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SSI
STRATEGIC SIMULATIONS INC.

— AIRCRAFT CAPABILITIES —

Here is a list of the aircraft types available for *EAGLES*™. Dates of operational use are included for scenario development.

AIRCRAFT TYPE	M%	S%	CI	DI	WP	ST	DATES
Allies							
NIEUPORT 17	60	50	4	7	1/1	60	1/17–2/18
NIEUPORT 28	50	70	3	9	2	65	4/18–8/18
SE5a	50	80	4	11	1/1	75	7/17–END
SOPWITH CAMEL	65	70	3	10	2	70	7/17–END
SOPWITH DOLPHIN	50	80	3	11	2	75	1/18–END
SOPWITH PUP	60	50	3	9	1	70	1/17–12/17
SOPWITH TRIPLANE	55	60	3	9	1	70	4/17–10/17
SPAD VII	45	70	3	11	1	75	1/17–12/17
SPAD XIII	50	80	4	12	2	80	10/17–END
BRISTOL F2b	45	45	2	9	1+1	75	4/17–END
Germans							
ALBATROS DIII	45	50	2	8	2	70	1/17–9/18
ALBATROS DV	50	60	3	8	2	70	6/17–END
FOKKER DR1	70	40	5	7	2	65	12/17–END
FOKKER DVII	60	80	4	11	2	80	5/18–END
PHALZ DIII	45	55	2	12	2	75	9/17–END
HANNOVER CL. IIIa	45	45	2	9	1+1	75	12/17–END
STANDARD RECON	30	20	1	7	1+1	60	ENTIRE WAR

M% — Maneuver Percentage
S% — Speed Percentage
CI — Climb in 25' increments
DI — Dive in 25' increments
WP — Weapons: 1 = 1 deck mounted
2 = 2 deck mounted
1/1 = 1 deck mounted, 1 wing mounted
1 + 1 = 1 deck mounted, 1 pivot mounted, two-seater
ST — Structural Strength
DATES — First month/year — last month/year